40 MARSHALL STAR

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Marshall-Managed Sensor Helps to Provide Severe Storms Warning

by Kelly McFalls

Weather and climate researchers are gaining unprecedented insights into rainfall-producing cloud systems over the tropical land masses and oceans from instruments flying aboard the Tropical Rainfall Measuring Mission — a joint NASA and Japanese Space Agency spacecraft. Initial information received from the rainfall-measuring observatory is exceeding expectations for accuracy and resolution, scientists say.

Last week, NASA released the first images from the spacecraft's Lightning Imaging Sensor, managed by Marshall, along with images from four other instruments flying aboard the craft. In a preliminary finding, images from the lightning sensor indicate that 98 percent of lightning occurs over land and very little occurs over the oceans.

"We believe that the increased lightning activity over land is primarily due to enhanced convection — continual overturning of the atmosphere that occurs as water, evaporated from the Earth's surface, carries excess heat energy into the upper atmosphere," said Dr. Hugh Christian, the principal investigator for the Lightning Imaging Sensor at the Global Hydrology and Climate Center at Marshall.

"Specifically, convection is just much stronger over land. This results in greater ice production and, consequently, more lightning," said Christian.

"The beauty of this mission is that the

*See **Lightning Imaging Sensor** on page 5*

NASA photo

Space Shuttle Discovery sits atop a mobile launcher platform at Launch Complex 39A at Kennedy Space Center after it was mated to the Marshall-managed first super lightweight external tank.

Photo by Terry Leibold

Marshall Team Steps Out for Health & Fitness Walk

Marshall's Program Development Director Axel Roth, second from left, and Pat Mirandy with the NASA Exchange Physical Exercise Program, right, team with colleagues to put their best foot forward at the starting line of Marshall's one-mile fitness walk May 20. The walk was one of many Center activities sponsored by Marshall's Medical Center and the NASA Exchange in recognition of National Employee Health and Fitness Day.

STS-91 Mission Set To Launch June 2

Following completion of a flight readiness review meeting, NASA managers set June 2 as the official date for the launch of Space Shuttle Discovery on the ninth planned docking mission with the Russian space station Mir. The flight, designated STS-91, will deliver logistics and supplies to Mir and also will bring home NASA astronaut Andrew Thomas, the seventh and final astronaut to serve as a Mir crew member. Thomas has been on the orbiting station since late January.

The Marshall-managed first super lightweight external tank is set to fly with Discovery. The improved tank was developed to increase Shuttle performance for the International Space Station assembly flights.

The current launch time of 5:10 p.m. CDT may vary slightly based on calculations of Mir's precise location in space at the time of liftoff due to Shuttle rendezvous phasing requirements.

STS-95 Astronauts Train at Center for Microgravity Experiments

by Steve Roy

Microgravity science experiments highlighted the activities of the STS-95 crew during a recent training visit to Marshall and Huntsville.

The crew received familiarization briefings and handson training concerning operations of the Microgravity Glovebox facility for microgravity investigations at Marshall's Microgravity Development Laboratory, and training on protein crystal growth experiments at Boeing. The STS-95 protein crystal growth experiments are being prepared for flight by the University of Alabama at Birmingham, Center for Macromolecular Crystallography, a NASA Commercial Space Center, and New Century Pharmaceuticals in Huntsville.

Much training focused on preparing the astronauts for operating investigations planned to be conducted in the Marshall-managed Microgravity Glovebox facility. During STS-95, the Microgravity Glovebox facility is scheduled to support two Microgravity Research Program investigations managed by NASA's Lewis Research Center; the Colloidal Disorder - Order Transitions experiment led by investigators Dr. Paul Chaikin and Dr. William Russell of Princeton University, in Princeton, N.j.; and the Colloidal Gel experiment led by Dr. Peter Pusey of University of Edinburgh, Scotland, and Dr. David Weitz of the University of Pennsylvania in Philadelphia. Project Manager Monica Hoffmann will lead the two investigations for Lewis Center. The Jet Propulsion Laboratory manages the

*See **Glovebox** on page 5*

Around Marshall

Aerospace Environmental Technology Conference Set for June 1-3 at the Von Braun Center

The Third Conference on Aerospace Technology will be held June 1-3 at the Von Braun Center. The conference is designed to bring together the aerospace community to describe, review and critically assess evolving replacement and clean propulsion technologies.

Technologies will be examined for their impact on aerospace systems as well as utilization by the research and development community. Implementation will be discussed from the NASA, Department of Defense, Department of Energy and the aerospace industry standpoint. Guest speakers include Marshall Center's Acting Director Carolyn Griner and Associate Director, Technical Bob Schwinghamer. Session chairs representing Marshall programs include Ann Whitaker, director, Materials and Processes Laboratory; Paul Goozh, Environmental Program manager; Salvadore Caruso, chief, Environmental and Analytical Chemistry Branch; Beth Cook, deputy, NOET Replacement Technology Team; Rebecca McCaleb, director, Environmental Engineering and Management Office; Benjamin Goldberg, deputy director, Structures and Dynamics Laboratory; and Ralph Carruth, chief, Engineering Physics Division. For more information, call 890-6010.

Katie Davis Named Scholarship Recipient

Katie Lynn Davis

Katie Lynn Davis is one of five 1998 NASA College Scholarship Fund winners. Davis is the daughter of Marshall team members Danny Davis, project manager for Low-Cost Technology Projects and Susan Davis, a Space Station payload mission planner in the Mission Planning Division of the Mission Operations Laboratory. Davis is a freshman at the University of Alabama in Tuscaloosa. The fund awards scholarships to dependents of NASA employees who are

Hoover Selected Member of NASA's New Virtual Astrobiology Institute

by John Bryk

Richard Hoover, an astrophysicist in Marshall's Space Sciences Laboratory, has been selected a member of NASA's new Astrobiology Institute — an electronic "virtual" laboratory that will conduct research on the complex issue of life in the universe and its cosmic implications.

As a member of the Astrobiology Institute, Hoover is an investigator on two of the Institute's programs: signatures of life in astromaterials, and the co-evolution of planets and biospheres. At Marshall, Hoover studies the microfossils in ancient rocks to help predict how the beginnings of life outside our planet might appear. Hoover has worked on X-ray telescopes for the Skylab space station, suborbital rockets and other missions.

Hoover uses Marshall's Environmental Scanning Electron Microscope to analyze biological specimens in their natural environment. The microscope also allows an X-ray scan to analyze the elements in a sample specimen — an important step in determining whether an object is organic.

"The structures of these basic life-forms may provide us with clues called biosignatures, which will help us know what to look for when trying to identify biological materials from space," said Hoover. "Evidence of microscopic life under Antarctic ice may indicate life would be possible in similar conditions in space. For instance, Jupiter's moon, Europa, has liquid oceans covered by ice."

Institute members will remain at their home organizations, as the partnership among the members and NASA will be carried out primarily via the Internet. NASA selected 11 academic and research institutions representing the best of 53 uniformly first-class proposals submitted.

Astrobiology Institute members will conduct a broad range of research on topics including the formation of organic compounds important to the origins of life, such as found in meteorites; the formation and characteristics of habitable planets; how the Earth

*See **Astrobiology Institute** on page 4*

Center Employees to be Honored at STS-91 Launch

These 22 Marshall Center employees are being honored for their significant contributions to the space program.

As Space Flight Awareness honorees, they will be hosted by NASA at Kennedy Space Center for the launch of STS-91.

Sherman Avans
EE31

Jim Ball
EB32

Rita Brazier
EB11

Rita Brock
AB11

Cheryl Erdner
TA11

Connie Godwin
EL61

Beth Guthrie
DA01

Efrem Hanson
GP01

David Jex
MG23

Herman Kesler
JA51

Alicia Luanne
Kidd SA31

Kirby Lawless
EH23

Jeffery McCaleb
SA52

Nancy McNeill
BP11

Neil Otte
ED24

Wayne Parks
PA01

Iris Phillips
EL02

Chris Reinecke,
CR70

Patrick Rogers
ED24

Steven Roy
CO70

Henry Stinson
EP74

Bernice Swain
EO37

Discovery by Astronomers at Center Confirms 'Magnetar' Existence

by Steve Calatrello

A neutron star, located 40,000 light years from Earth, is generating the most intense magnetic field yet observed in the universe, according to an international team of astronomers led by scientists at Marshall.

The discovery confirms the existence of a special class of neutron stars dubbed "magnetars." Magnetars have a magnetic field estimated to be one thousand trillion times the strength of Earth's magnetic field. A neutron star is a burned-out star roughly equal in mass to the Sun that has collapsed through gravitational forces to be only about 10 miles across. Magnetars have a magnetic field that is about 100 times stronger than the typical neutron star.

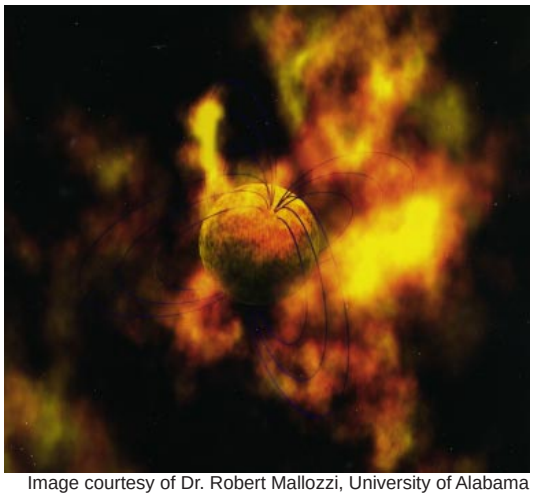

Image courtesy of Dr. Robert Mallozzi, University of Alabama at Hunstville and Marshall Center

Above is a concept image of what a magnetar might look like. The thin blue lines are renderings of the superstrong magnetic field lines of this kind of star.

The discovery, published in the May 21 issue of the journal Nature, was made by a team of astronomers at Marshall led by Dr. Chryssa Kouveliotou of the Universities Space Research Association, working with Dr. Stefan Dieters of the University of Alabama in Huntsville, Professor Jan van Paradijs of UAH and the University of Amsterdam and Dr. Tod Strohmayer of Goddard Space Flight Center.

"This finding should help us better calculate the rate at which stars die and create the heavier elements that later become planets and other stars," Kouveliotou said.

"Kouveliotou and her team determined the strength of the magnetic field by combining data gathered by NASA's Rossi X-Ray Timing Explorer satellite with data from the Advanced Satellite for Cosmology and Astrophysics, a collaborative mission between Japan and the United States.

The magnetic field generated by this star is truly incredible," Kouveliotou said. "It is so intense that it heats the surface to 18 million degrees Fahrenheit. Periodically, the field drifts through the crust of the neutron star, exerting such colossal forces that it causes a 'starquake.' The 'starquake' energy is then released as an intense burst of low-energy gamma rays."

Since these bursts happen quite often and the bulk of their energy is in low-energy (soft) gamma rays, the objects associated with them had been named Soft Gamma Repeaters. When bursting, Soft Gamma Repeaters are among the brightest objects in the sky, giving off as much energy in a single second as the Sun does in an entire year. The magnetar in question, called SGR 1806-20 by astronomers, was first discovered when it emitted soft gamma ray bursts.

Astronomers have debated the origin of Soft Gamma Repeaters since they were first observed in 1979. With this discovery, however, researchers believe the origin of Soft Gamma Repeaters lies in the "starquake" phenomena of magnetars. The magnetar theory was first proposed in 1992 by astrophysicists Dr. Robert Duncan of the University of Texas at Austin and Dr. Christopher Thompson of the University of North Carolina at Chapel Hill.

Astronomers believe that at least 10 percent of neutron stars are born with magnetic fields that are strong enough to be considered magnetars. Neutron stars are created in supernovae explosions and they spin rapidly, at rates up to hundreds of revolutions per second.

The magnetar SGR 1806-20 is observed to be spinning once every 7.5 seconds and is slowing down roughly three milliseconds per year. Superstrong magnetic fields cause a neutron star to"brake" and "cool down," making it practically impossible to observe them in radio waves or X-rays. This means there could be thousands or even millions of these dark relics scattered throughout our Milky Way galaxy. This could account for the large number of observed supernovae remnants without detectable neutron stars at their centers.

For more information on magnetars and this discovery, visit Marshall's Space Sciences Laboratory website at: http://science.msfc.nasa.gov

Astrobiology Institute

Continued from page 2

and life have influenced each other over time; and the evolution of complex systems in simple animals.

Astrophysicists, biologists, chemists, physicists and geologists who are members of the Institute also will help to train young scientists in this field.

These initial Astrobiology Institute members will be at the forefront of the increasingly important link between astronomy and biology, which has been a fundamental interest of mine for the past several years," said NASA Administrator Dan Goldin.

"The 'office hallways' of this virtual institute will be the fiber optic cables of the Next Generation Internet. And the groundbreaking research that this group generates will help guide our space exploration priorities well into the 21st century."

The Institute is a major component of NASA's Origins Program, created to search for signs of life in the universe, both in our Solar System and beyond.

For more information on the Institute and the field of astrobiology, visit the Internet site: http://science.msfc.nasa.gov/

Upcoming Events

Asian-Pacific American Heritage Month to be Celebrated Sunday

A fun-filled afternoon of food, games, music and dance is planned Sunday during a potluck picnic celebrating Asian-Pacific American Heritage Month. The picnic is scheduled to begin at noon at Marshall's picnic area. All Marshall employees, contractors and family members are invited. Anyone interested in attending is asked to bring a dish from their native country as the admission ticket. For more information, call Lynn Chou at 544-1591 or Alan Chow at 544-7107.

Bookfair Planned June 2-4

The NASA Exchange is sponsoring the semi-annual bookfair from 8 a.m.-4 p.m., June 2-4 in Bldg. 4200, room G-13. A variety of hardback books will be offered at substantial discounts including bestsellers, cookbooks, gardening, biographies, sports and children's selections.

Lightning Imaging Sensor

Continued from page 1

unique array of instruments aboard the spacecraft allows us to test this hypothesis time and again," he said. "This mission will enable us to gain fundamental insights into the properties of these convective storms and thus better estimate the effects on global weather patterns."

The small, sophisticated lightning sensor looks at both day and night cloud-to-ground, cloud-to-cloud and intra-cloud lightning, as well as its distribution around the globe. The lightning sensor is helping to pave the way for a future space-based lightning mapper that could deliver day and night lightning information to a forecaster's workstation within 30 seconds of occurrence — providing an invaluable tool for storm "nowcasting" and giving people more advance warning of severe storms.

The suite of instruments, launched on a rocket in November 1997, is scheduled to collect information for three years.

Photo by Danny Reeves

STS-95 crew members, from left to right, Steve Robinson, Scott Parazynski, Chiaki Mukai and Pedro Duque practice operating the Microgravity Glovebox facility during a recent training visit to Marshall's Microgravity Development Laboratory. The Middeck Glovebox will support three microgravity experiments during the October mission.

Glovebox

Continued from page 2

third Microgravity Glovebox experiment — the Internal Flows in Free Drops experiment led by Dr. Satwindar S. Sadhal of the University of Southern California in Los Angeles.

"STS-95 crew members learned about the operations of the Microgravity Glovebox and accompanying microgravity science investigations and we feel they are fully versed in the tasks they are being asked to do on orbit," explained Microgravity Glovebox Project Manager Dave Jex of the Microgravity Research Program. "We had a great training session for the crew."

Microgravity Glovebox facility Project Scientist is Dr. Donald A. Reiss of Marshall's Space Sciences Laboratory.

The primary objectives of STS-95, scheduled for launch in October, include a variety of microgravity science investigations and commercial space product development payloads being carried in the pressurized Spacehab module, the deployment and retrieval of the Spartan free-flyer payload, and operations with the HST Orbiting Systems Test and the International Extreme Ultraviolet Hitchhiker payloads being carried in the payload bay.

The Spartan carrier activities include reflight of the Automated Rendezvous and Capture experiment, a Marshall-managed experiment led by project manager Gene Beam of the Space Transportation Program. The study is intended to demonstrate on-orbit operation of a video-laser docking sensor system

The STS-95 crew will be commanded by Curt Brown, joined by Pilot Steve Lindsey; Mission Specialists Scott Parazynski, Steve Robinson and Pedro Duque; and Payload Specialists Chiaki Mukai and John Glenn.

Sixteen microgravity science and commercial experiments and facilities slated for STS-95 are sponsored by the Center's Microgravity Research Program. More information about these experimnets will follow in an upcoming Marshall Star.

Obituaries

Patrick, Donald, 64, Atlanta, Ga., died May 13. He retired from Marshall in 1990 where he worked as a mechanical engineer.

Foxworthy, Davis, 84, Huntsville, died May 13. He retired from Marshall in 1973 where he worked as a technical service officer. He is survived by his wife Edith Foxworthy.

Cowley, Walter, 78, Huntsville, died May 14. He retired from Marhall in 1974 where he worked as an engineering technician. He is survied by two sons, Walter Cowley Jr. of Daphne, Ala., and Robert Cowley of Huntsville.

Employee Ads

Miscellaneous

★ Rainbow SE vacuum cleaner with shampooer, $395; Hoyt-Easton compound bow with case, $140. 586-1195
★ Casio electronic business organizer scheduling system w/ 64K memory, PC compatable, $40. 461-8237
★ Power lift for outboard motor $250; LeBra bug protector for Eagle Talon, Eclispe, $35. 837-4136
★ Sears 3100ps programmable speed treadmill, $190. 536-6228
★ Butler Creek synthetic rifle stocks for 10/22 Ruger w/bull barrel, $30 each. (931) 438-0476
★ 20" mower, 3.5hp, $35. 461-8237
★ Rear tine tiller, 6hp, disassembled, $250. 837-0085
★ Sharp 1000 watt microwave w/ carousel, $100. 883-4735
★ Camcorder, VHS, GE, auto-focus, titler, DSP-3 signal processor, $325. 883-2757
★ Hackberry china cabinet, buffet style, glass doors, $400. 881-6436
★ Two Macintosh Performa computers, 475 w/ 13" color monitor, $300; SE30 w/padded case, $150. 778-9149

Vehicles

★ 1995 Gulfstream Friendship 38', 102 motor coach, Spartan chassis, Cummins diesel engine, Allison transmission, 1995. 350-3784
★ 1993 RV Jayco fifth wheel 30' with wheel, tail gate, extras, $13,500. 864-0155
★ 1996 Nissan 240SXSE, moonroof, CD 5 speed sports package, extended warranty, price negotiable. 772-3800
★ 1995 Chevrolet Tahoe, 4x4, CD, tow pkg., 2 dr., extended warranty, 29K miles, 859-7567
★ 1994 Ranger XLT Supercab 4.0L V-6, AT/AC, stereo cassette, cruise, P/W&L, 44K miles. $9,995. 880-8134
★ 1982 Yamaha Vision 550,12,500 miles, $1,800. 233-7207 after 6 p.m.
★ 1994 Grand Voyager SE, 3.3 V6, wildberry, rear air, PW/PL, rack, integrated child seat, remote, 60K miles, $9,995. 721-0617
★ 1986 Olds Cutlass 2 dr. coupe, tan, $2,250. 828-0239
★ 1993 Mazda 626 LX, white, 4 dr., 2.0L, 5 spd., all power, 52K miles, $9,000. 461-8359
★ 1990 Acura Integra GS, blue, 3 dr. , auto, sunroof, 85K miles, $6,000 obo. 461-0902
★ 1986 Cavalier wagon, $1,800. 837-0085
★ 1995 Isuzu Rodeo, black, tinted windows, PS/ PL. 355-6116
★ 1995 Pontiac Firebird Formula, LT1, red, Corvette engine, 6 spd., T-tops, CD, 75K miles, $11,000. 881-5577
★ 1989 Oldsmobile Delta 88, $1,995. 922-0958
★ 1990 Ford Ranger 4.0L, auto transmission, $3,100. 883-5823
★ 1995 Buick Park Ave, white w/ grey interior, 36K miles, touring suspension, $20,500. 837-5782

Boats

★ Sunfish sailboat, racing sail and centerboard, $1,100; Sailboard Mistral competition, $500. 880-3765

Found

★ Money near Bldg. 4752 on May 20. 4-3309

Center Announcements

☛ ***NASA Alumni League*** — The NASA Alumni League MSFC Chapter will sponsor a dinner June 11 at the Valley Hill Country Club. A social will begin at 6:30 p.m., with a buffet dinner at 7:30 p.m. Tickets are $16 per person and payable to Ed Buckbee, 811 Esslinger Road, S.E., Huntsville, AL 35802. Reservation deadline is June 5.

☛ ***MOO***— The Management Operatons Office (MOO) retirees will meet for breakfast/lunch May 28 (4th Thursday of each month) at the Cracker Barrel in Madison at 10 a.m. Retirees and all present or former MOO employees are welcome. Call 539-0042 with any questions.

☛ ***MMA***— The Marshall Management Association (MMA) will sponsor a luncheon May 28 at 11:30 a.m. at the Bevill Center. Dr. Thomas Sever of the Global Hydrology & Climate Center at Marshall will be the guest speaker. The luncheon cost is $12 and payable at the door. Call Jerry Williams for information.

☛ ***Bookfair*** — The NASA Exchange is sponsoring a bookfair 8 a.m.-4 p.m June 2-4 in Bldg. 4200, room G-13. An array of hardback books, including bestsellers, cookbooks, gardening, biographies, sports and children's selections will be offered at substantial discounts.

☛ ***OSHA Hearing Conservation Training*** — Mandatory OSHA Hearing Conservation Training is scheduled for today in Bldg. 4200, Morris Auditorium. Two sessions will be offered — 8 a.m. and 9:30 a.m. If you have any questions, call Marshall's Environmental Health Office at 544-2390.

☛ ***"Progress in Advanced Space Transportation Research" Topic of Talk*** — "Progress in Advanced Space Transportation Research," presented by John Cole, Marshall's Space Transportation Research Office manager, will be the topic of a talk set for 7-8:30 p.m. today. The event will be held in the Huntsville-Madison County Public Library auditorium. This event is free, open to the public and sponsored by the Huntsville L5 Society Chapter of the National Space Society. For details, call Ronnie Lajoie at 971-3055 or Wade Dorland at 534-2566.

☛ ***NARFE*** — The National Association of Retired Federal Employees (NARFE), Chapter 736 will meet at 11 a.m. today at Morrison's Cafeteia in Decatur. Morgan County Sheriff Steve Crabbe will discuss Morgan County issues and Megan's Law. All retired federal employees are invited. For more information, call 355-2874 or 773-4826.

☛ ***Toastmasters' International*** — The NASA Lunar Nooners Toastmasters Club will meet on Tuesday June 2 at 11:30 a.m. in Bldg. 4610, cafeteria conference room. MSFC employees, contractors and friends are invited to attend. For more information, call Debbie Hagar at 539-4499, or Lee Johns at 544-5142.

☛ ***American Express Travel Vacation Office*** — The American Express Travel Vacation Office in Bldg. 4203, suite 1109, will be closed June 5. The office will reopen June 8.

Job Opportunities

CPP 98-42-DC, Supv. AST, Data Systems, GS-854-15, S&E, Astrionics Laboratory, Computers & Data Systems Division. Closes today.

CPP 98-39-CL, AST, Technical Management, GS-801-14, Space Transportation Programs Office, Planning and Operations Office. Opened May 26 and closes June 8.

CPP 98-54-RE, Administrative Assistant, GS-341-5, S&E, Propulsion Laboratory. Opened May 26 and closes June 2.

CPP 98-56-JB, Contract Specialist, GS-1102-12/13, Procurement Office, Research and Development Support Division. Opened May 26 and closes June 8.

CPP 98-62-JB, AST, Aerospace Flight Systems, GS-861-14, S&E, Space Systems Chief Engineers, Microgravity Experiment Project Engineering. Opened May 26 and closes June 8.

CPP 98-66-DC, AST, Electrical Power Systems, GS-850-14, S&E, Astrionics Laboratory, Electrical Division, Electrical Power Branch. Opened May 26 and closes June 2.

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